

CLAIMS

What is claimed is:

1. A method of making a current collector plate for use in a proton exchange membrane fuel cell, the method comprising the steps of:

- 5 (a) molding by injection or compression molding a composition comprising from about 10 to about 50% by weight of a plastic, from about 10 to about 70% by weight of a graphite fibre filler, and from 0 to about 80% by weight of a graphite powder filler to form the current collector plate having two surface layers;
- 10 (b) measuring the thickness of the current collector plate; and
- (c) removing the surface layers to reduce the thickness of the current collector plate by no more than about 10 micrometers.

15 2. The method of Claim 1, wherein the thickness of the current collector plate is reduced by no more than about 5 micrometers.

3. The method of Claim 1, wherein the thickness of the current collector plate is reduced from about 2 to about 4 micrometers.

20 4. A method of making a current collector plate for use in a proton exchange membrane fuel cell, the method comprising the steps of:

- (a) molding by injection or compression molding a composition comprising from about 10 to about 50% by weight of a plastic, from about 10 to about 70% by weight of a graphite fibre filler, and from 0 to about 80% by weight of a graphite powder filler to form the current collector plate having two surface layers, wherein one or both of the surfaces comprise flow field channels and lands defined by the channels;
- 25 (b) measuring the thickness of the current collector plate at the lands; and
- 30 (c) removing the surface layers at the lands to reduce the thickness of the current collector plate at the lands by no more than about 10 micrometers.

35 5. The method of Claim 4, wherein the thickness of the current collector plate is reduced by no more than about 5 micrometers.

6. The method of Claim 4, wherein the thickness of the current collector plate is reduced from about 2 to about 4 micrometers.

7. A method of making a current collector plate for use in a proton exchange membrane fuel cell, the method comprising the steps of:

- 5 (a) molding by injection or compression molding a composition comprising from about 10 to about 50% by weight of a plastic, from about 10 to about 70% by weight of a graphite fibre filler, and from 0 to about 80% by weight of a graphite powder filler to form the current collector plate having two surface layers;
- (b) measuring the current collector plate's average thickness;
- 10 (c) measuring the current collector plate's through-plane resistivity;
- (d) removing a portion of the surface layers by abrasion; and
- (e) repeating steps (a) to (d) until a desired plate thickness is removed,

15 wherein the desired plate thickness is no more than about 10 micrometers.

8. The method of Claim 4, wherein the desired thickness is no more than about 5 micrometers.

9. The method of Claim 4, wherein the desired thickness is reduced by about 2 to about 4 micrometers.

20 10. A method of making a current collector plate for use in a proton exchange membrane fuel cell, the method comprising the steps of:

- 25 (a) molding by injection or compression molding a composition comprising from about 10 to about 50% by weight of a plastic, from about 10 to about 70% by weight of a graphite fibre filler, and from 0 to about 80% by weight of a graphite powder filler to form the current collector plate having two surface layers, wherein one or both of the surfaces comprise flow field channels and lands defined by the channels;
- 30 (b) measuring the current collector plate's average thickness at the lands;
- (c) measuring the current collector plate's through-plane resistivity;
- (d) removing a portion of the surface layers at the lands by abrasion; and
- 35 (e) repeating steps (a) to (d) until a desired plate thickness at the lands is removed,

wherein the desired plate thickness is no more than about 10 micrometers.

11. The method of Claim 10, wherein the desired thickness is no more than about 5 micrometers.

12. The method of Claim 10, wherein the desired thickness is reduced by about 2 to about 4 micrometers.

5 13. A current collector plate for use in use in a proton exchange membrane fuel cell, wherein the current collector plate has two surfaces and one or both of the surfaces comprise flow field channels and lands defined by the channels, the current collector plate is made by the process steps of:

- 10 (a) molding the current collector plate by injection or compression molding from a resin/conductive filler composition;
- (b) measuring the current collector plate's average thickness at the lands;
- 15 (c) measuring the current collector plate's through-plane resistivity;
- (d) removing a portion of the current collector plate's surface layer at the lands by abrasion; and
- (e) repeating steps (a) to (d) until a desired plate thickness is removed,
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wherein the desired plate thickness is no more than about 10 micrometers.

14. The current collector plate of Claim 13, wherein the desired thickness is no more than about 5 micrometers.

25 15. The current collector plate of Claim 13, wherein the desired thickness is reduced by about 2 to about 4 micrometers.

16. A current collector plate for use in use in a proton exchange membrane fuel cell made by the process steps of:

- 30 (a) molding the current collector plate by injection or compression molding from a resin/conductive filler composition;
- (b) measuring the current collector plate's average thickness;
- (c) measuring the current collector plate's through-plane resistivity;
- (d) removing a portion of the current collector plate's surface layer by abrasion; and
- 35 (e) repeating steps (a) to (d) until a desired plate thickness is removed,

wherein the desired plate thickness is no more than about 10 micrometers.

17. The current collector plate of Claim 16, wherein the desired thickness is no more than about 5 micrometers.

18. The current collector plate of Claim 16, wherein the desired thickness is reduced by about 2 to about 4 micrometers.

5